HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	White River Spring Chinook (Minter Creek and Hupp Springs Hatcheries)
Species or Hatchery Stock:	White River Spring Chinook (Onchorhynchus tshawytscha)
Agency/Operator:	Washington Department of Fish and Wildlife
Watershed and Region:	Minter Creek, Puget Sound
Date Submitted:	August 23, 2002
Date Last Updated:	August 21, 2002

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

White River Spring Chinook (Minter Creek and Hupp Springs Hatcheries)

1.2) Species and population (or stock) under propagation, and ESA status.

Spring Chinook (Onchorynchus tshawytscha), listed as "threatened" under ESA

1.3) Responsible organization and individuals

Name (and title):	Ron Warren, Region 6 Fish Program Manager Denis Popochock, Complex Manager	
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

The White River Spring Chinook Restoration Program is a cooperative program involving WDFW (Minter Creek and Hupp Springs Hatcheries) and the Muckleshoot Tribe (White River Hatchery and acclimation ponds). The South Sound Spring Chinook Technical Committee, responsible for developing the White River Spring Chinook Recovery Program, consists of members from WDFW, USFS, and the Muckleshoot, Puyallup, Nisqually and Squaxin Tribes.

1.4) Funding source, staffing level, and annual hatchery program operational costs.

This program at (Minter Creek / Hupp Springs Hatcheries) is funded through the State General Fund.

1.5) Location(s) of hatchery and associated facilities.

Minter Creek Hatchery:	Located at the mouth of Minter Creek (15.0048), a tributary to Carr Inlet, Puget Sound
Hupp Springs:	Located at RM 3 of Minter Creek

1.6) Type of program.

Isolated Recovery.

1.7) Purpose (Goal) of program.

Restoration.

The goal of this recovery plan is to restore White River spring chinook to the White River watershed. This goal will be achieved when the sustainable escapement goal of 1,000 unmarked spawners per year is met in three out of four consecutive years with the normal level of incidental sport, commercial and tribal harvest (White River Recovery Plan for Spring Chinook, 1996).

1.8) Justification for the program.

The program will enhance the survival of the listed stock by maintaining a source of genetically protected eggs through the egg bank program conducted at Minter Creek and Hupp Springs Hatcheries. To see relationship between the Minter Creek/Hupp Springs program and the White River Hatchery program, please refer to the tribal (Muckleshoot) HGMP.

1.9) List of program "Performance Standards". see below

1.10) List of program "Performance Indicators".

Performance Standards and Indicators for Puget Sound **Isolated Recovery** Chinook programs.

Performance Standard	Performance Indicator	Monitoring and Evaluation Plan
Produce adult fish for hatchery broodstock	Survival and return rates	Monitor catch and survivals using CWT data, measure hatchery returns
Meet hatchery production goals	Number of juvenile fish released - **250,000 fingerlings 85,000 yearlings**	Estimate number of fish planted (weighing / counting fish), monitor proximity to hatchery production goals, number released recorded on Hatchery Division's "plants reports", data available on WDFW database.

Manage for maximum escapement to the hatchery rack	Catch and hatchery return rates	Monitor and document adult returns to the hatchery, catch records
Minimize interactions with listed fish through proper broodstock management	Total number of broodstock collected - **540 adults**	Measure number of fish actually spawned to meet eggtake goal Hatchery records Trap fish throughout run, dates and times recorded on Hatchery Division's "adult reports, data available on WDFW database. Spawner survey data, CWT data
	Sex ratios	
	Age Structure	
	Timing of adult collection/spawning - **early May to September**	
	Hatchery stray rate	
	Return timing of hatchery adults - **early May to September**	
	Adherence to spawning guidelines - **1:1 with 4 fish pools and use of backup males**	
Minimize interactions with listed fish through proper rearing and release strategies	Juveniles released as smolts	Future Brood Document Hatchery records CWT data
	Out-migration timing of listed fish / hatchery fish - / **April-May**	
	Size and time of release **50 fpp/May release** **8 fpp/April release**	
Maintain stock integrity and genetic diversity	Effective population size	Spawning guidelines Spawner surveys
	Monitor divergence of hatchery fish morphology and behavior characteristics	
	HOR spawners	

Maximize in-hatchery survival of broodstock and their progeny; and Limit the impact of pathogens associated with hatchery stocks, on listed fish	Fish pathologists will monitor the health of hatchery stocks on a monthly basis and recommend preventative actions / strategies to maintain fish health	Follow Co-Manager's Disease Policy
	Fish pathologists will diagnose fish health problems and minimize their impact	Fish Health database
	Vaccines will be administered when appropriate to protect fish health	
	A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings	
	Fish health staff will present workshops on fish health issues to provide continuing education to hatchery staff.	
Ensure hatchery operations comply with state and federal water quality standards through proper environmental monitoring	NPDES compliance	Monthly NPDES reports

1.11) Expected size of program.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

The current program utilizes all returning White River spring chinook adults. Returns to Minter Creek Hatchery have varied from 300-700 adults.

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location. (*Use standardized life stage definitions by species presented in* Attachment 2).

Life Stage	Release Location	Annual Release Level
Eyed Eggs		
Unfed Fry		
Fry		
Fingerling	Minter Creek (15.0048)	250,000
Yearling	Minter Creek (15.0048)	85,000

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

a) Smolt-to-adult survivals: 1988-96 broodyears (RMIS database):
Average survival for subyearling releases = 0.25 % (range 0.10 % - 0.62 %)
Average survival for yearling releases = 0..36 % (range 0.04 % - 0.80 %)

b) Using these average survivals:
Expected adults produced annually from subyearling releases would be approximately 625 (250,000 x 0.25 %)

Expected adults produced annually from yearling releases would be approximately 306 (85,000 x 0.36 %)

c) Returns of White River spring chinook to Minter Creek Hatchery (1991-1999)

Return Year	Number of Adults*
1991	232
1992	465
1993	332
1994	316
1995	427
1996	496
1997	407
1998	213
1999	372

* These are the fish used for broodstock. Actual total returns are slightly higher due to pre-spawning mortality.

1.13) Date program started (years in operation), or is expected to start.

Started in 1974.

1.14) Expected duration of program.

Ongoing. When annual total returns of untagged adults to the White River watershed achieve or exceed 1000 adults per year in three of four consecutive years with the normal level of incidental sport, commercial and tribal harvest, program emphasis at Hupp Springs / Minter Creek will be changed from recovery to a targeted harvest (White River Recovery Plan for Spring Chinook, 1996).

This concept was endorsed by the Hatchery Scientific Review Group, HSRG, which was established, by Congress, as an independent hatchery review entity. In its' February, 2002, Hatchery Reform Recommendations, the HSRG recommended the following actions to the Co-managers:

1. Discontinue the conservation program, unless this program is demonstrated to be critical to the conservation effort on the White River spring chinook.
2. If the conservation program continues, implement protocols to reduce domestication and minimize genetic changes resulting from artificial propogation.
3. If the goals for the program change, the program shouold be reevaluated.

1.15) Watersheds targeted by program.

Minter Creek (15.0048)
White River (10.0031) indirectly

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

None at this time.

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

2.1) List all ESA permits or authorizations in hand for the hatchery program.

None

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

There are no ESA-listed natural salmonid populations in the program target area. Salo and Bayliff (1958) noted the absence of an indigenous fall chinook stock in Minter Creek. In this watershed, adult chinook returns and any resulting natural production are dependent upon local hatchery program production. Available habitat is not typical productive fall chinook habitat and probably would not support a self-sustaining, naturally spawning fall chinook population. If the local hatchery production program was terminated, it is expected that natural chinook production in this watershed would eventually disappear. These opinions could be tested by identifying all hatchery fall chinook production in this watershed and monitoring natural productivity.

2.2.1) Description of ESA-listed salmonid population(s) affected by the program.

- Identify the ESA-listed population(s) that will be directly affected by the program.

White River Spring Chinook.

- Identify the ESA-listed population(s) that may be incidentally affected by the program.

South Sound Tributary fall chinook. Stock-specific spawning ground, juvenile life history, survival and productivity data are generally lacking for this natural population. The population is presumed to be similar in biological characteristics to the other south Puget Sound fall chinook populations (Puyallup River and Green River fall chinook), since it is thought to be dependent on ongoing hatchery production (strays) in south Puget Sound. SASSI defines this stock as naturally spawning chinook in a number of widely distributed rivers, including McAllister Creek, Grovers Creek, Gorst Creek, Chambers Creek, Carr Inlet tributaries, the Deschutes River and other small streams in south Puget Sound.

2.2.2) Status of ESA-listed salmonid population(s) affected by the program.

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds

Critical and viable population threshholds under ESA have not yet been determined however, the White River spring chinook population has been determined to be "critical" and South Sound Tributary summer/fall chinook are considered "healthy" under SASSI (June 1994).

- Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

There are currently no data available for this stock.

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.

White River Spring Chinook Average Annual Returns, 1992 to 1999: 462 (range 316-604)

Estimates of fall chinook spawning naturally in South Sound Tributaries:

Year	# Fish
1988	4257
1989	4979
1990	15814
1991	3681
1992	3610
1993	2998
1994	4950
1995	7456
1996	14931
1997	4192
1998	6372
1999	11028

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

Unknown. These escapements are likely predominantly hatchery-origin fall chinook because of low escapements passed above the rack and expected low natural chinook productivity in this watershed.

South Sound Tributaries fall chinook - Unknown, although SASSI states that stock status is dependent upon local hatchery production.

2.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take.

Not applicable - there are no listed natural populations in the program target area.

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

Not applicable for native listed fish as none exist. There are no listed natural populations in the program target area.

For the White River spring chinook recovery program, take will be associated with hatchery recovery operations: collection, holding and spawning of adults, and mortality incurred during incubation and rearing. Under normal operation parameters, adverse risks associated with the above activities should be minimal. NMFS will be notified prior to exceeding the take in any category.

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.

Not applicable for natural listed fish. There are no listed natural populations in the program target area.

- Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).

At Minter Creek, all returning spring chinook are trapped for broodstock*

Average take levels from the hatchery program:
Pre-spawning mortality.....14% (range 5 to 28%- all surviving adults are spawned)
Egg to fry mortality:..... 9%.
Fry to release mortality.....7%.

**See 7.4.2 for 1988-1999 broodstock collection levels.*

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

NMFS will be notified prior to exceeding the take in any specific category.

Not applicable for natural listed fish. There are no listed natural populations in the program target area.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

There are no applicable plans or policies at this time.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

This program is described and its production parameters are dictated by the White River Spring Chinook Recovery Plan and the program is consistent with that plan.

3.3) Relationship to harvest objectives.

WDFW and the affected Treaty Tribes have jointly limited Carr Inlet Treaty and non-Treaty chinook fisheries to minimize harvest impacts on White River spring chinook as they return to Minter Creek, at the expense of precluded Minter Creek fall chinook harvest.

3.3.1) Describe fisheries benefitting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

The following fishery contribution rates are based on analysis of 1988 through 1993 brood coded-wire-tag recoveries. Contribution rates include all catches of two- through five-year-olds.

Hupp Springs White River Spring Chinook Fingerling Releases:

Fishery	**Mean Contribution Rate (Catch/fingerling released)**
Alaskan Fisheries	0.0002%
Canadian Fisheries	0.0181%
Oregon Fisheries	0.0003%
WA Ocean Treaty Troll	0.0080%
Ocean Sport	0.0003%
PS Treaty Net	0.0056%
PS Sport	0.0429%
Total Fishery Contribution	**0.0754%**

This contribution rate would estimate a total fishery contribution of 189 fish from a programmed release of 250,000 fingerlings. The average harvest rate, based on the tag recoveries for this program, is estimated to be 36.5% for all fisheries and 27.6% for Washington fisheries.

Hupp Springs White River Spring Chinook Yearling Releases:

Fishery	Mean Contribution Rate (Catch/yearling released)
Alaskan Fisheries	0.0000%
Canadian Fisheries	0.0203%
Oregon Fisheries	0.0004%
WA Ocean Non-treaty Troll	0.0018%
WA Ocean Treaty Troll	0.0097%
Ocean Sport	0.0002%
PS Treaty Net	0.0220%
PS Sport	0.1952%
Total Fishery Contribution	**0.2496%**

This contribution rate would estimate a total fishery contribution of 212 fish from a programmed release of 82,500 yearlings. The average harvest rate, based on the tag recoveries for this program, is estimated to be 52.7% for all fisheries and 48.3% for Washington fisheries.

Note: this program is directed toward White River spring chinook recovery, not harvest.

3.4) Relationship to habitat protection and recovery strategies.

Not applicable - there are no listed natural populations in the program target area.

3.5) Ecological interactions.

The risk of predation by hatchery-origin subyearling White River spring chinook on naturally produced White River spring chinook is considered "low". These fish do not interact in the freshwater environment as they occur in different watersheds. Impacts of hatchery-origin White River spring chinook on local, South Sound tributary stocks is also considered "low" as these fish outmigrate at approximately the same size.

The risk of predation by hatchery-origin yearling White River spring chinook on naturally produced White River spring chinook is considered "unknown". Again, these fish do not interact in the freshwater environment. The risk of predation by hatchery-origin yearling White River spring chinook on naturally produced South Sound tributary stock chinook is also considered "unknown". As yearlings, these fish outmigrate quickly minimizing interaction in freshwater. Marine / estuarine interactions are unknown.

The risk of competition between hatchery-origin White River spring chinook and naturally produced White River spring chinook is considered "unknown". They do not interact in freshwater environment as they occur in different watershed. Competition in the marine / estuarine environment is unknown.

In freshwater and estuarine areas, program spring chinook yearlings may prey upon chum and chinook fry. They may compete with yearling coho, steelhead, and cutthroat; additionally, competition with older cutthroat and steelhead is possible. Program spring chinook fingerlings may be preyed upon by yearling and older steelhead and cutthroat and yearling coho in the freshwater and estuarine areas. Factors limiting marine production are not clearly understood (e.g. forage species population dynamics and status, fluctuations in environmental physical parameters, marine carrying capacity, etc.), but there are likely unquantified competitive relationships between program fish and other natural chinook stocks within the Puget Sound ESU.

Increasing pinniped populations in Puget Sound may be negatively affecting survival of this program's production. Additionally, avian predators appear to be attuned to releases of Hupp Springs hatchery-origin chinook.

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

Hupp Springs Hatchery: Pathogen-free spring water is used to rear spring chinook. Water is supplied from an artesian spring (Hupp Springs) located 1/4 mile upstream from the hatchery. An intake situated at the lower end of the spring collects water; this water is then transported via a pipeline to the hatchery. Hupp Springs is 100% gravity fed and supplies between 1500 - 1700 gallons per minute (gpm) with an average temperature of 46-48° F.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

Minter Creek Hatchery

Intake screens do not currently conform with NMFS screening guidelines because they are outdated. They pose no threat to the White River spring chinook as all adults are collected at the hatchery. The intake poses no threat to local South Sound tributary chinook as no natural production of chinook occurs above the hatchery rack at Minter Creek (no chinook are passed upstream). These intake screens are scheduled to be replaced in the near future.

Hupp Springs

There is no pollution abatement pond at Hupp Springs for settling of pond wastes; consequently, they are applied to the wooded perimeter of the hatchery grounds .

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Adult broodstock collection occurs at the Minter Creek Hatchery fish ladder/trap: the ladder guides returning adults to a retention area where adults are sorted into a holding pond. Broodstock collection begins the second week in May (for spring chinook) and continues through the end of the chum run in mid-December.

5.2) Fish transportation equipment (description of pen, tank truck, or container used).

White River spring chinook are transported in planting tanks of varying size, depending on the number of adults that need to be moved. The first and largest haul requires a 1000 gallon tank outfitted with an adult gate. As the season progresses, a smaller, 350 gallon tank is used. Whenever necessary, tanks are equipped with supplemental oxygen and recirculation pumps.

5.3) Broodstock holding and spawning facilities.

Broodstock are held at Minter Creek Hatchery in 20'x140'x4' adult ponds until the first week in July when they are transported to Hupp Spring Hatchery; this delay in transport is a preventative measure to reduce mortality by allowing fish to set their scales before handling. Adults are held on spring water until initiation of spawning in the second week of September.

At Hupp Springs, adults are held in 10'x100'x4' standard rearing ponds that are spring fed with an average flow of 250 gpm. To protect eggs from rain and direct sunlight, adults are spawned on site under a shed.

5.4) Incubation.

Spring chinook eggs are incubated at Minter Cr. Hatchery in pathogen-free well water. Isolation vertical incubators are used to prevent the spread of disease. Fry are kept at Minter Creek Hatchery until ponding. Egg density at hatching is 5.4 pounds per tray (approximately 6,500 eggs).

5.5) Rearing facilities.

After swim up, chinook fry are moved to Hupp Springs Hatchery and separated into four 10'x100'x4' standard raceways. Fry are reared on spring water. Maximum density at release for the zero-age program is .54 pounds/cubic foot (lbs/cu.ft.). Yearling program chinook are put into a 1/5 acre gravel- bottomed rearing pond with a minimum flow of 1700 gpm. Final rearing density at release is 1.26 lbs/cu.ft.

5.6) Acclimation/release facilities.

In addition to Hupp Springs water, yearling chinook are acclimated to Minter Creek water from mid-February until release in mid-April. Acclimation water is pumped from Minter Creek at a rate of 350 gpm.

5.7) Describe operational difficulties or disasters that led to significant fish mortality.

None

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

Hupp Springs Hatchery is equipped with an alarm system run by a primary power source of 110 volts and a 12 volt battery auxiliary. Ponds 1-4 have low flow alarms and pond 5 has a float alarm. Fencing equipped with an intrusion sensor surrounds the standard ponds (where the adults are held). All alarms are connected to Minter Creek Hatchery which is staffed 7 days a week, 24 hours a day.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1) Source

The original brood source was native adult spring chinook returning to the White River.

6.2) Supporting information.

6.2.1) History.

The WDFW began restoration efforts of the White River spring chinook in 1974. From 1974 to 1976, adults were captured at the Buckley trap then transferred to and spawned at one of two WDF hatcheries (either Garrison Springs Hatchery or Voights Creek Hatchery). Their progeny were returned to the White River as fingerlings or smolts. In 1977, the White River spring chinook brood was released into Minter Creek rather than into the White River. This change signaled the beginning of the effort to maintain White River spring chinook through off-site restoration, and all subsequent releases, until 1990, were limited to Minter Creek. Initially, WDF and NMFS maintained two complimentary programs: 1) the anadromous broodstock program at Hupp Springs Hatchery, and 2) a captive brood program at the NMFS Manchester net pens complex. Through 1986, at least some broodstock for these programs were adults which returned to the Buckley trap. Since 1986, all broodstock has come from adult returns to Minter Creek Hatchery and from the captive brood program.

The captive brood program began at the NMFS saltwater net pens at Manchester which involved the 1977-1986 broods. The Manchester operation was discontinued after the 1986 brood and was replaced by a program managed cooperatively by WDFW and the Squaxin Island Tribe at the South Sound Net Pen complex (SSNP), near Olympia, Washington.

The anadromous program expanded in 1989 with construction of the Muckleshoot Indian Tribe's White River Hatchery located on the White River directly opposite the adult trap at Buckley. This facility, similar in size to Hupp Springs, has doubled the size of the core program in brood stock and juvenile releases. 1992 marked the first year that hatchery fish, 3 year olds from the 1989 broods, returned to their site of release within the White River watershed. These returning adults provided a third source of eggs for the program from fish best adapted to the system.

All White River spring chinook juveniles produced beyond the needs of the then captive brood program and the Hupp Springs program were transferred to the hatchery on the White River and acclimation ponds in the upper White River drainage for release. This release in the upper watershed took place after 1996 when the problems of downstream

passage at Mud Mountain Dam were alleviated. Upon return as adults, the White River Hatchery allows the adults to spawn in the upper watershed.

6.2.2) Annual size

All adult WRSC available are spawned. Returns vary from year to year and range from 300 - 700 adults.

6.2.3) Past and proposed level of natural fish in broodstock.

None.

6.2.4) Genetic or ecological differences.

White River spring chinook are genetically distinct from all other chinook in lower Puget Sound.

6.2.5) Reasons for choosing.

This is the indigenous population of the White River. They are the last remaining spring chinook stock in southern Puget Sound and are genetically distinct from other chinook in Puget Sound.

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

All White River spring chinook released from Minter Creek Hatchery are 100 % coded-wire tagged. All adult spring chinook returning to Minter Creek Hatchery are electronically sampled for coded-wire tags and those coded-wire tags are read prior to spawning to ensure only White River stock is used for the program.

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

Adults.

7.2) Collection or sampling design.

Returning adults are trapped at Minter Creek Hatchery beginning the second week of May and continued through October. Adults are electronically sampled for coded-wire tags. Tagged fish are transported to Hupp Springs Hatchery. Chinook that do not have a coded-wire tag are used for Minter Creek egg take.

7.3) Identity.

All hatchery-originWhite River spring chinook are coded-wire tagged as juveniles. Only positively identified White River adults are used as broodstock.

7.4) Proposed number to be collected:

All White River spring chinook adults returning to the rack at Minter Creek Hatchery will be collected for spawning.

7.4.1) Program goal (assuming 1:1 sex ratio for adults)

To meet the proposed egg take goal of 750,000, assuming a sex ratio of 1:1 and 10% mortality rate, 540 adults are required for broodstock.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

Year	ADULTS Females	ADULTS Males	Jacks	Eggs	Juveniles
1988	68	100	10	175,000	
1989	269	172	2	741,700	
1990	105	129	4	312,000	
	68	*13*		*102,000*	
1991	114	122		287,000	
	455	*518*		*1,230,000*	
1992	178	285	133	414,000	
	422	*549*		*1,107,500*	
1993	202	207		535,000	
	435	*307*		*1,130,000*	
1994	145	171		365,000	
	421	*555*		*811,000*	
1995	194	371	240	544,800	
1996	280	324	98	741,700	
	195	*138*		*390,000*	
1997	187	196	114	475,000	
1998	133	266	117	318,000	
1999	221	340	178	536,000	
2000	185	184	4	555,000	
2001	207	202	5	621,000	

* *Italics* reflect actual numbers of adults and eggs taken for a supplemental adult captive brood program. Within this program, fry originating from captive broodstock were transferred to White River Hatchery or into acclimation ponds on the White River; they were not released into Minter Creek.

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

All White River spring chinook returning to the Minter Creek Hatchery will be spawned; there has never been a surplus of broodstock..

7.6) Fish transportation and holding methods.

Adult spring chinook are transported in either a 1000 gallon or 350 gallon tank according to WDFW guidelines which specify loading densities for salmon. An aerator and supplemental oxygen is used to maximize oxygen availability to the fish during transport.

Adults are moved to the upper end of the pond with an automated fish crowder. Using a dip net, each fish is removed from the water and placed in a rubber boot. Each fish is then given an antibiotic injection and placed in the transport tank. Total loading time is approximately one hour. Transit time to Hupp Springs is under 15 minutes. At Hupp Springs, adults are placed into a standard pond at a maximum density of 250 fish per pond.

7.7) Describe fish health maintenance and sanitation procedures applied.

Fish health measures are consistent with the Co-Managers Fish Health Policy (NWIFC and WDFW 1998).

7.8) Disposition of carcasses

All adults at Hupp Springs Hatchery have been treated with antibiotic drugs; consequently, they are buried on-site or sent to a local landfill.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

Only coded-wire tagged White River spring chinook are used as broodstock. These tags are read prior to spawning to ensure that only White River stock are used in the broodstock and to prevent the inclusion of strays into the gene pool. The risk of fish disease will be minimized by following sanitation and fish health maintenance and monitoring guidelines outlined by the Co-Manager's Fish Health Policy. No stray listed fish will knowingly be incorporated into the gene pool.

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

8.1) Selection method.

Adults are selected randomly from ripe fish.

8.2) Male

Backup males are used to replace primary males that were spawned out or dry. Jacks are used at a level of 2% of the population.

8.3) Fertilization.

Adults are spawned 1:1. Individual matings are then combined into four fish pools. Fish health measures are in compliance with the Co-Manager's Fish Health Policy.

8.4) Cryopreserved gametes

No cryopreserving of gametes is done at this time.

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

1:1 mating scheme will be used to reduce the risk of loss of genetic diversity within the population**.**

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

Date	Eggs Taken	Eyed up Survival	Ponding Loss
1995	544,800	91.4%	2%
1996	741,700	95.1%	2%
1997	475,000	95.0%	2%
1998	318,000	96.9%	2%
1999	448,000	95.4%	2%

9.1.2) Cause for, and disposition of, surplus egg takes.

After the core program at Hupp Springs is achieved, any surplus eggs or fry are shipped to the Muckleshoot Indian Tribal Hatchery and / or acclimation ponds on the White River.

9.1.3) Loading densities applied during incubation

Using heath vertical incubator trays with flows of 4 gpm, the following loading densities are applied:

Fertilization to Eyed Stage: 6200 eggs per tray (4.13 lb. per tray *or* eggs from two females)

Eyed Stage to Ponding: 6500 eggs per tray (5.41 lb.)

9.1.4) Incubation conditions.

Well water is used for incubation of White River spring chinook. Siltation has never been a problem. Float alarms are used to safeguard against decreases in water levels within all of the incubation rooms. Water temperature is monitored electronically.

9.1.5) Ponding.

Fry are ponded (placed into ponds from the incubators) when the ventral slit has closed to a 1-3 mm opening or 1800 Temperature Units (TU's) have been reached. Ponding activity begins the last week of December and continues through the third or fourth week of January.

9.1.6) Fish health maintenance and monitoring.

Fungus is controlled with daily 15 minute formalin drip treatments at a concentration of 1:600 (1667 parts per million (ppm)). Egg mortalities are hand picked when eggs reach the eyed stage.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

Eggs will be incubated using well water to minimize mortality due to siltation. Water is monitored for low flows.

9.2) Rearing:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available.

Dates	Fry to Fingerling	Fingerling to Smolt
1995		
1996	95.82 %	98.73 %
1997	93.60 %	95.30 %
1998	94.40 %	97.57 %
1999	95.18 %	Data not yet available

9.2.2) Density and loading criteria (goals and actual levels).

Recommended maximum density index for chinook reared in raceways is 0.20 lbs/ft3 (See Piper, 1982 or Fish Health Manual (November 1996). Density at release is 0.38lbs/ft3.

9.2.3) Fish rearing conditions

Daily water temperatures are monitored using a high/low thermometer. Pond maintenance includes weekly cleaning and daily picking of mortalities. Weekly monitoring is conducted on water flow and dissolved oxygen levels. Sampling for dissolved oxygen levels is completed with the use of a Hatch kit or a digital probe.

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

Not available.

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

Not Available.

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Bio-Moist Grower, an extruded frozen semi-moist feed, is used to feed ponded fish by hand. The feeding frequency employed is as follows:

Fish Size (#fish/lb)	Number of Feedings/Day
1200	6 to 8
600	4 to 6
400	3 to 4
100 & larger	once daily

Feeding rates are based on program release size of 50 fish per pound (fpp) in early June. First "egg take" of fry are ponded the last week of December with following "takes" one week apart until fry are out of the hatchery. Initial feeding starts the day after fry are ponded. Fry are started at 2.5% B.W./day to insure fry get off to a good start. Fry are sampled on a weekly basis to monitor growth rate. Body weight % is adjusted accordingly to insure fish meet program release size in June .

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.

Fish health monitoring is conducted monthly by the fish health specialist for the Minter Creek Complex. Ponds are vacuumed weekly. Empty ponds are disinfected using a one hour treatment with an iodophor (100 ppm active ingredient) solution.

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

Not applicable.

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

Not used.

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

Fish reared at Hupp Springs will be released in April and May to mimic natural fish out-migration timing on the White River.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry				
Fry				
Fingerling	250,000	50	May	Minter Creek
Yearling	85,000	8	April	Minter Creek

10.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse:
Release point: Hupp Springs Hatchery
Major watershed: Minter Creek (15.0048)
Basin or Region: Puget Sound, Henderson Bay

10.3) Actual numbers and sizes of fish released by age class through the program.

Release Year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size (fpp)	Yearling	Avg size (fpp)
1988					84,250	60	76,700	6
1989					95,526	45	83,074	5
1990					248,700	40	89,737	9
1991					189,000	60	91,173	5
1992					252,400	60	81,000	7
1993					240,100	71	77,801	8
1994					259,391	48	89,852	8
1995					251,584	52	88,309	7
1996					254,990	48	84,506	7
1997					254,606	50	84,539	8
1998					202,508	53	90,575	8
1999					250,265	56	84,539	8
2000					250,022	57	90,575	8
2001					243,327	50	90,337	9
Average					219,762	54	85,908	7

10.4) Actual dates of release and description of release protocols.

Year	Life Stage	Start Date	End Date
1995	Fingerling	May 5	May 5
	Yearling	April19	April 30
1996	Fingerling	June 6	June 6
	Yearlings	April15	April 30
1997	Fingerling	May 29	May 29
	Yearlings	April 7	April 24
1998	Fingerling	May 28	May 28
	Yearlings	April 6	April 29
1999	Not available		

Fish are released during high tides to prevent them from becoming entrapped within tide pools that form at low tides. Fingerling smolts are flushed from ponds while yearlings are initially volitionally released to reduce pond densities. The remaining pond population is subsequently forced to leave with the use of 25 foot seine when they attain sufficient size.

10.5) Fish transportation procedures, if applicable.

Not applicable.

10.6) Acclimation procedures.

White River spring chinook are reared at Hupp Springs on spring water. Fry are transferred from Minter Creek Hatchery to Hupp Springs the last week in December. Two months prior to release, yearlings are started on a mixture of spring and Minter Creek water for acclimation until release in mid-April. Fingerlings (zeros) receive acclimation water from April until release in late May- early June.

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

Coded-wire tags only are applied to100% of the spring chinook population to allow positive identification and genetic segregation as adults from fall chinook returning to Minter Creek Hatchery and to prevent them from being harvested in a fishery.

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

Any surplus from Hupp Springs program will be transferred to the Muckleshoot Indian Tribal hatchery for rearing and release into the White River. If a surplus of eggs or fry remain, the White River Technical Committee will decide where excess will go. This generally is to a facility with pathogen free water so the fish can be transferred to acclimation ponds in the White River watershed.

10.9) Fish health certification procedures applied pre-release.

Each lot of fish is examined by a WDFW Fish Health Specialist prior to release or transfer, in accordance with the Co-Managers Salmonid Disease Policy.

10.10) Emergency release procedures in response to flooding or water system failure.

In the event of a water system failure, screens would be removed to allow fish to exit the pond. In some cases, they could be transferred into alternative rearing vessels to avert an emergency release.

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

White River spring chinook will be released as smolts to minimize freshwater residence time and possible interactions with listed fish.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

Note: See section 1.10 for Monitoring and Evaluation. The purpose of a monitoring program is to identify and evaluate the benefits and risks which may derive from the hatchery program. The monitoring program is designed to answer questions of whether the hatchery is providing the benefits intended, while also minimizing or eliminating the risks inherent in the program. A key tool in any monitoring program is having a mechanism to identify each hatchery production group.

Each production group shall be identified with distinct otolith marks, adipose clips, coded wire tags, blank wire tags or other identification methods as they become available, to allow for evaluation of each particular rearing and/or release strategy. This will allow for selective harvest on hatchery stocks when appropriate, monitoring of interactions of hatchery and wild fish wherever they co-mingle in riverine, estuarine and marine habitats and assessment of the status of the target population. WDFW shall monitor the Chinook salmon escapement into the target and non-target Chinook populations to estimate the number of tagged, un-tagged and marked fish escaping into the river each year and the stray rates of hatchery Chinook into the rivers.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

Continue to coded-wire tag only fish to allow identification at the hatchery rack and to continue this program as a recovery effort (protect from fishing effort) until a sustainable escapement of 1000 adults per year is attained in 3 of 4 consecutive years to the White River watershed.

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

Funding and resources are currently committed to monitor and evaluate this program as detailed in the Resource Management Plan for Puget Sound Chinook Salmon Hatcheries (Washington Department of Fish and Wildlife and Puget Sound Treaty Tribes, August 23, 2002).

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

Monitoring and evaluation will be undertaken in a manner which does not result in an unauthorized take of listed chinook.

SECTION 12. RESEARCH

12.1) Objective or purpose.

Because of their size at release and their potential to be cannibalistic, yearling chinook could pose a threat to listed populations of salmon. The potential for negative impacts on wild populations of chinook and other species increases with the magnitude of residualism and the rate of cannibalism. Hatchery reared White River spring chinook outmigrants will be weighed and measured as they are released from the Hupp Springs Hatchery (Minter Creek) and a small number sacrificed to determine sex ratio of outmigrants. Portions of Minter Creek will be sampled using electrofishing or seining gear to determine if residual chinook are present. Fish captured will be weighed and measured and compared to the fish that were sampled at release. A portion of the residual chinook will be subsampled to determine prey items and also sex ratio.

12.2) Cooperating and funding agencies.

National Marine Fisheries Service (NMFS).

12.3) Principle investigator or project supervisor and staff.

Howard Fuss, WDFW
Sherman Davis, WDFW (Manager, Hupp Springs Hatchery).

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

Hatchery releases only.

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

Fish will be captured using dip nets as they exit rearing pond or seined while residing in Minter Creek. Approximately 200 fish will be anesthetized, weighed, measured and released. Fewer than 100 fish will be sacrificed from those collected in the creek to determine sex, level of maturity and determine what prey items the fish are consuming.

12.6) Dates or time period in which research activity occurs.

Research will occur from April 2, 2001 until June 30, 2001.

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.

Fish will be held and anesthetized according to standard protocols to assure safe release.

12.8) Expected type and effects of take and potential for injury or mortality.

We expect less than 1% mortality on the fish collected for measurement.

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).

We expect to sacrifice up to 100 1+ smolts/precocial males collected at the hatchery and creek during the time period.

12.10) Alternative methods to achieve project objectives.

We have not identified any alternatives to determining sex ratio through non-lethal methods. Lavage can be used to determine stomach contents.

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

We expect to encounter cutthroat (<25), coho (<500) and chum salmon (<500).

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

We have not identified any alternatives to determining sex ratio through non-lethal methods. Lavage can be used to determine stomach contents.

SECTION 13. ATTACHMENTS AND CITATIONS

Piper, Robert, et. al., 1982, Fish Hatchery Management; United States Dept of Interior, Fish and Wildlife Service, Washington, DC.

Washington Department of Fish and Wildlife. 1996. Fish Health Manual. Hatcheries Program, Fish Health Division, Washington Department of Fish and Wildlife, Olympia.

Seidel, Paul, 1983, Spawning Guidelines for Washington Department of Fish and Wildlife Hatcheries, Washington Department of Fish and Wildlife, Olympia.

Washington Department of Fish and Wildlife. Hatchery Operation Plan and Performance Summaries. 1995.

Washington Department of Fish and Wildlife and Puget Sound Treaty Tribes, 2002, "Puget Sound Chinook Salmon Hatcheries, Resource Management Plan", a component of Comprehensive Chinook Salmon Management Plan, August 23, 2002. 103 pages.

Washington Department of Fish and Wildlife, Puyallup Indian Tribe and Muckleshoot Indian Tribe. Recovery Plan for White River Spring Chinook. 1996.

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

Table 1. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: White River Spring Chinook	**ESU/Population: Puget Sound**	**Activity: Rearing / Spawning**		
Location of hatchery activity: Minter Creek / Hupp Springs	**Days of activity: May-April**	**Hatchery program operator: WDFW**		
Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)***			
	Eggs/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)				
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)			300 to 1,500	
Unintentional lethal take g)	9% of total eggs	7 % of total fish	14% of adult	
Other Take (specify) h)				

NOTE: Egg loss ranges from 8 to 11% of total eggs collected. Fry loss ranges from 1 to 17% of fry ponded. Adult loss ranges from 5 to 28% of adults trapped. All adults collected are considered a "take" as all are spawned. Range: 1992 to 1999 = 316 to 604 adults.

1. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.